



For Official Use Only

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Science and Technology Perspectives

DEVELOPMENTS

Reciprocal Data Base

(Finland/USSR) A preliminary agreement was signed on April 7 by the Finnish Computer Technology Center at Kotka and the Soviet V/O Vneshtorgreklama to establish a joint import-export data base to promote trade between the two countries. The Finnish data base will contain information on Soviet products, services, patents, and licenses, while the Soviet data base will contain corresponding data on Finland. The system is expected to be in commercial use by the end of the year. (Helsinki HUFVUDSTADSBLEDET 8 Apr 87)* Elli M. X2519

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Superconductivity

USSR: Superconductivity Research Intensifies Page 5
Since April, Soviet scientists reportedly have given superconductivity research a priority second only to that of achieving controlled nuclear fusion.

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Neural Networks

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Researchers are using advanced algorithms and high-tech optical devices to develop a new generation of information processing machines.

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PERSPECTIVES selections are based solely on foreign press, books and journals, or radio and television broadcasts. Some of the materials used in this publication will appear as abstracts or translations in FBIS serial reports. Comments and queries regarding this publication may be directed to the Managing Editor (Craig M.) or to individuals at the numbers listed with items.

STAT

FOR OFFICIAL USE ONLY**DEVELOPMENTS**

DEVELOPMENTS highlight S&T events reported in the foreign media. Items followed by an asterisk will be published by FBIS. The contributor's name and telephone number are provided.

Aerospace

(Bulgaria) The Bulgarian Academy of Sciences has established a Space Research Institute under the direction of Boris Bonev. The institute will focus on the transfer of space-related research to Bulgarian industry. It will have research laboratories and several small enterprises that manufacture aviation and space instruments. Institute programs will include space-based development of new materials, space communications and navigation systems development, and biomedical research. It will also design equipment for the Soviet Phobos project. (Sofia ROBOTNICHESKO DELO 10 Apr 87) Rita S. X2609

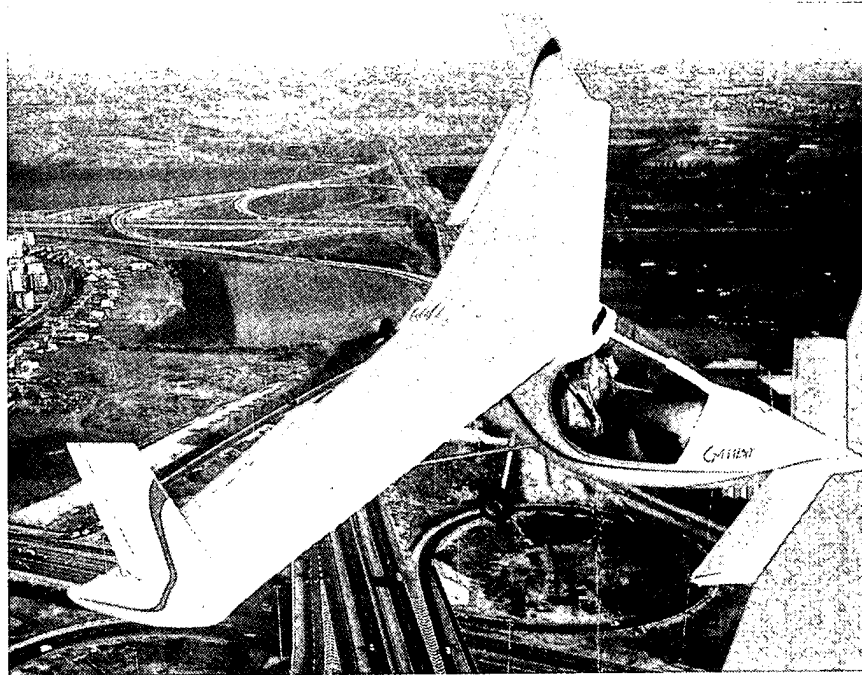
(Japan) The National Space Development Agency (NASDA) has announced plans to renovate the Tanegashima Space Center to accommodate four H-II rocket launches a year beginning in the mid-1990s, twice the number of H-I launches currently being handled at the site. It would represent what many aerospace companies consider an economically feasible Japanese launch program. The plan calls for an H-II launch pad and a new service tower, which would allow work on a second rocket immediately after a launch. The four launches would be evenly divided between two 45-day periods during January-February and August-September each year. (Tokyo NIKKAN KOGYO SHIMBUN 17 Mar 87) Mitchy E. X2726

(UK/USSR) The UK and the USSR have signed a 10-year protocol providing for cooperative space research in the areas of solar astronomy and astrophysics, biomedicine, and materials development in microgravity. The British National Space Agency, the Universities of London and Birmingham, and Soviet biomedical and space institutes will participate. Under the protocol, UK scientists will have an as yet unspecified role in the Soviet Phobos project and in a 1992-94 joint X-ray astronomy mission, the details of which will be finalized by a joint submillimeter astronomy working group. (Paris AIR & COSMOS 11 Apr 87; Frankfurt/Main FINANCIAL TIMES 1 Apr 87)* Elli M. X2519

(France) The CNES (French National Space Studies Center) has redesigned its Hermes spaceplane to include an ejectable crew cabin and an enclosed, pressurized cargo bay—reducing overall weight at launch from 25 to 21 metric tons, the payload from 4.55 to 3 metric tons, and the crew from four to three. Hermes' first flight (now scheduled for 1997 instead of 1995) will be preceded by the test flight of an unmanned, full size Hermes vehicle in 1996. (Paris AIR & COSMOS 21 March 87) Eva L. X2519

FOR OFFICIAL USE ONLY**Aircraft**

(Israel) In April the Israelis began marketing the Gambit, a two-seater recreational/training aircraft, intended primarily for export. Developed by Skycraft, the Gambit uses lightweight materials and has a state-of-the-art design. The aircraft, which costs \$20,000 to \$30,000, has a 400 to 600 kilometer range and initially will be sold as a kit requiring up to 400 hours assembly time. It is speculated that the Gambit may have military applications. (Tel Aviv BAMAHAANE Apr 87) Andrea S. X2830



The Gambit

Microelectronics

(FRG/Netherlands) A 4-megabit superchip prototype with 0.8-micron line widths has been produced by the Siemens-Philips Megaproject and will be ready for series production in the fall of 1988, according to FRG Research Minister Heinz Riesenhuber. Total project costs (DM3.4 billion) are broken down into DM1.4 billion for chip development and DM1.5 billion for production plant construction with the FRG Government providing DM320 million for the chip project and the Dutch Government allocating DM160 million. (Bonn DIE WELT 18 Mar 87; Duesseldorf HANDELSBLATT 18 Mar 87)* Elli M. X2519

Ceramics

(Japan) Fuji Denpa Industries has developed a multi-purpose high temperature furnace that will be used in the development of new materials, particularly fine ceramics. The furnace performs vacuum hot pressing, pressurized hot pressing, vacuum and pressurized sintering, and high temperature CVD. The furnace can produce temperatures of 2300°C with 9.5 atmospheres of air pressure at 5 metric tons of internal pressure. Its compact size (1.9 square meters) and light weight (1.4 tons, half the weight of current hot presses) will simplify installation and reduce costs. (NIKKAN KOGYO SHIMBUN, KAGAKU KOGYO SHIMBUN 3 Mar 87) Junko A. X2726

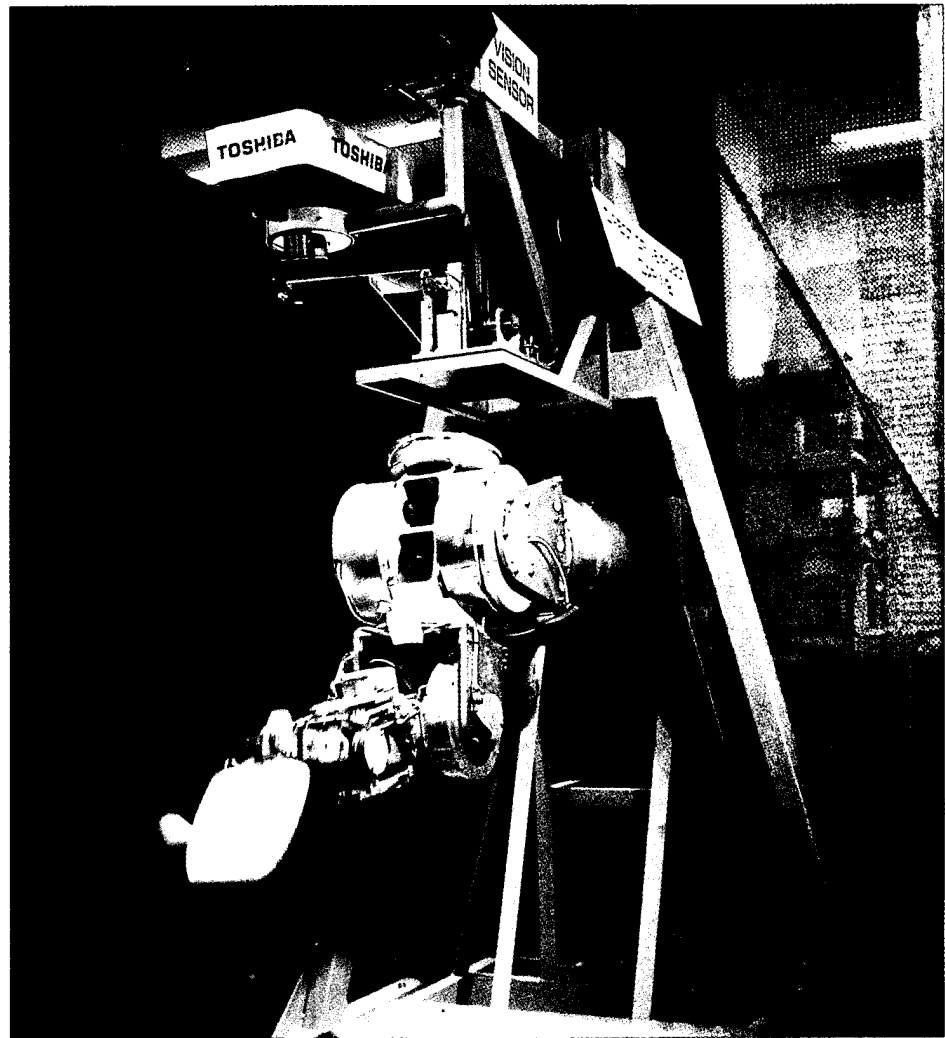
(Japan) The Science and Technology Agency's Inorganic Materials Research Institute has developed a dry method of synthesizing functional ceramics. The research group has produced a tightly compacted sintered body by

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creating submicron particles (0.2-0.4 microns) from metallic oxide powder. The synthesis of PZT and PLZT using this new method has resulted in tight and even composition, higher density (by some 60 percent), and improved cost efficiency. (NIKKAN KOGYO SHIMBUN 3 Mar 87) Junko A. X2726

Robotics

(Japan) Toshiba is testing a newly developed vision system on a Ping-Pong playing robot. The system is capable of detecting the ball's trajectory and computing its time of arrival within two milliseconds using four 32-bit circuit boards in the robot's control center. The machine has seven axes, each equipped with a direct drive motor. The robot, however, is unable to compensate for deviations in trajectory, and stray motion by the ball severely hampers the robot's ability to hit it. The Toshiba robot was developed primarily for use in hazardous environments such as nuclear power plants. (Tokyo TRIGGER Feb 87) Akiko S. X2726



The Toshiba Robot

Satellite Data Link

(Poland) The Polish Academy of Sciences' Space Research Center is developing a network to transmit computer data by satellite based on principles similar to those used in satellite television transmission. A cooperative effort with the Soviet Academy of Sciences' Space Research

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Institute, the network will also facilitate the dissemination of scientific data gathered by research satellites and interplanetary probes. (Warsaw ZOLNIERZ WOLNOSCI 21 Apr 87) Rita S. X2609

Science City

(Yugoslavia) A 10-hectare "science city" composed of 10 buildings and staffed with more than 3,000 researchers will be built on Belgrade's Zvezdara Hill in 1988. Proposed by the Mihajlo Pupin Institute of Belgrade (which specializes in computers and industrial robots), the facility will focus on transferring research results to industry, developing international marketing strategies for Yugoslav products, and bolstering the domestic manufacture of high-tech goods. Over 20 Yugoslav firms and several foreign companies have expressed interest in joint R&D activity. (Belgrade TANJUG 29 Mar 87) Rita S. X2609

Technology Transfer

(France/Czechoslovakia) France's Agency for Technical, Industrial, and Economic Cooperation (ACTIM) and its Czech counterpart, UVTEI, have signed an agreement establishing the Center for French Scientific and Technical Documentation to be headquartered in Prague. The center will promote cooperation in the exchange of S&T information, arrange exhibits, and act as a liaison between French and Czech trade organizations. (Prague CHEMICKY PRUMYSL No. 2, Feb 87) Rita S. X2609

**Word Processing
Software**

(Vietnam) Hanoi has announced the domestic development of a Vietnamese-language word processing software package and a conversion program that automatically translates telegraphically coded telex messages into Vietnamese (complete with diacritics) for printing. The designer of the software was identified as the son (name not given) of Vietnam's foreign minister and as an East Bloc-trained engineer. (Hong Kong FAR EAST ECONOMIC REVIEW 7 May 87) Cecilia G. X2149

FOR OFFICIAL USE ONLY**USSR: SUPERCONDUCTIVITY RESEARCH INTENSIFIES**

Key Points: Soviet scientists are moving from low-temperature experiments with metal alloys to research in which they have achieved a critical temperature of 110K using a ceramic oxide. Although prior claims of having attained superconductivity at 250K were retracted, Soviet researchers are experimenting with compounds that may yet produce results at high temperatures, according to reports in the Soviet media.

Soviet scientists are giving priority to the application of ceramic oxide superconductors in microcircuits and computer memory components (projecting compact computers capable of performing billions of operations per second) and, eventually, in inexpensive magnetic resonance imaging machines, superpowerful particle accelerators, and tokamaks (although the Tokamak-15, scheduled for operation in 1988, reportedly will not be modified to accommodate superconductor components). Soviet research on high-temperature superconducting materials began only recently. Prior to last year the highest temperature for a Soviet-made superconductor was 23.2K, achieved using a niobium-germanium alloy. Soviet physicists intend to replace such low-temperature superconducting alloys with a new generation of high-temperature ceramic materials, should problems with brittleness and lack of malleability prove manageable. In addition, Soviet institutes engaged in superconductivity research have (as of late April) only been able to develop superconducting materials capable of carrying minimal levels of electricity.

Soviet physicist V.L. Ginzburg, a winner of the Lenin Prize for his work in superconductivity and diamagnetism, has stated that by late April Soviet R&D in high-temperature superconductivity had assumed a priority status second only to research in controlled thermonuclear fusion. According to Ginzburg, the use of superconducting materials will facilitate the achievement of controlled thermonuclear fusion by creating the extremely powerful magnetic fields needed to contain superheated plasma. He added that this goal would probably be much closer to realization had Soviet chemists, who developed a yttrium-barium-copper oxide in 1979, tested the compound for superconductivity. While physics institutes are equipped to test for zero resistivity and diamagnetism, Soviet chemistry institutes generally have not been tasked with superconductivity research.

Motivated by foreign research that has resulted in high-temperature breakthroughs with ceramic oxides, Soviet physicists have used a yttrium-barium-copper oxide to attain a critical temperature of 110K. However, A. Golovashkin of the USSR Academy of Sciences' Physics Institute recently claimed that his team had observed the beginning of transition to superconductivity by this oxide at 250K. He announced that resistivity in the compound decreased by a factor of more than 10,000, although the tendency toward superconductivity was only a "flash" and diamagnetism could not be detected at that temperature. A TASS report (6 Apr) on Golovashkin's work implied that true superconductivity had been achieved at near room temperature and hailed the breakthrough as a revolution in science comparable to the discovery of nuclear fission. The Golovashkin claim, however, was discredited by Italian physicist Antonio Barone, who was present when the "breakthrough" occurred. Barone stated that superconductivity had been achieved by Golovashkin but at a critical temperature of 93K, according to a report in *ITALIA OGGI* (9 Apr).

On 22 April, Aleksey Abrikosov of the Moscow Institute of Steel and Alloys firmly denied that Soviet physicists had developed a compound with a 250K critical temperature. He explained that the scientists had observed a sharp drop in resistivity at that temperature but that zero resistivity had not occurred. Abrikosov emphasized that the highest verified temperature achieved by a Soviet-made superconductor remains 110K.

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In a related development, the Soviet weekly IZVESTIYA NEDELYA (20-26 Apr) reported that Dr. K. Likarev of Moscow State University has produced a ceramic that displays "signs" of superconductivity at 300K (room temperature). Neither the makeup of the compound nor its superconducting characteristics was described.

John H. X2723

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EAST EUROPE: REPORT ON SUPERCONDUCTIVITY RESEARCH

Scientists in several East Europe countries are conducting superconductivity research that has resulted in achieving critical temperatures ranging from 43K to a claimed 173K. The following survey presents the results of this research as reported by the East European press in March and April.

Reported in March:

— Researchers at the Polish Physics Institute used a ceramic oxide ("similar" to that employed by US scientists) to achieve superconductivity at a critical temperature of 77K.

— Yugoslav scientists from several institutes used an unidentified ceramic oxide to achieve superconductivity at 91K.

Reported in April:

— Bulgarian physicists at Sofia's Kliment Okhridski University used an unidentified compound to achieve superconductivity at 43K.

— Researchers at Hungary's Lorand Eotvos University used a lanthanum-barium-copper oxide provided by the Hungarian Central Chemical Research Institute to achieve superconductivity at temperatures between 51-56K. Experiments conducted with a yttrium-barium-copper oxide resulted in critical temperatures between 85-94K.

— Scientists at Hungary's Physics of Solids Research Institute used unidentified ceramic oxides to achieve a critical temperature of 92K. The institute reportedly has focused on understanding the mechanism of superconductivity rather than on breaking temperature records.

— A team of Hungarian physicists led by Dr. Jozsef Bankuti reportedly achieved superconductivity at a critical temperature of 173K using a ceramic oxide of yttrium, barium, and copper (cooled with liquid nitrogen) prepared by Lorand Eotvos University's Chair of Low Temperature Physics. (For additional coverage on the Bankuti team's research, see HUNGARY: WORLD RECORD IN SUPERCONDUCTIVITY CLAIMED, FB PN 87-083.)

Rita S. X2609/Sari P. X2907

FOR OFFICIAL USE ONLY**USSR: SUPERCONDUCTIVITY R&D (DATA BASE SURVEY)**

Soviet superconductivity research conducted in 1986 was the topic of a Pascal data base search from which the following citations are taken. Based in France, Pascal indexes worldwide scientific literature collected by the French National Scientific Research Center. Additional searches and full-text translations of the records cited below can be provided on request.

TECHNOLOGY	DESCRIPTIVE
Leningrad Electrotechnical Institute im. Ulyanova	R&D on the superconducting ceramic Ba(Pb,Bi)O ₃ intended for use in telecommunications components is discussed by M. Belskiy, O. Vendik, A. Gayevskis, A. Kozyrev, V. Morozik, and T. Samoylova. The results of surface resistance experiments are detailed. (Zhurnal tekhnicheskoy fiziki, 1986, Vol. 56, No. 2)
Donetsk Physico-Technical Institute	By exposing an unspecified superconducting material to helium, Y. Ivanchenko, P. Mikheyenko, and Y. Yuzhelevskiy observed resistivity and superconduction under Anderson localization. (Zhurnal tekhnicheskoy fiziki, 1986, Vol 56, No. 8).
Moscow State University	A. Perov examines the use of localized heating to determine the existence of an infinite cluster in the granular superconducting ceramic BaPb ₃ /4Bi ₁ /4O ₃ . (Pisma v zhurnal eksperimentalnoy i teoreticheskoy fiziki, 1986 Vol. 43, No. 7)
Moscow State University	A. Buzdin and A. Mikhaylov analyze autowaves in magnetic superconductors undergoing transformation from a state of superconductivity to semiconductivity. (Zhurnal eksperimentalnoy i teoreticheskoy fiziki, 1986, Vol. 90, No. 1)
Physics Institute of the Academy of Sciences	The effects of heating on current transfer in the superconducting ceramic BaPb(1-x)Bi(x)O ₂ are studied by N. Belous, A. Gabovich, D. Moiseyev, V. Postnikov, and A. Chernyakhovskiy. The ceramic is tested in liquid helium to determine its thermal dissipation characteristics. (Zhurnal eksperimentalnoy i teoreticheskoy fiziki, 1986, Vol. 91, No. 1)

Eva L. X2519/John H. X2723/Kris P. X2898

FOR OFFICIAL USE ONLY**FRANCE: ASSOCIATIVE MEMORY RESEARCH**

Key Points: French scientists conducting experimental R&D in neural network information processing machines have made advances in algorithms and new devices called optical valves in an effort to increase the machine's ability to handle complex sensory situations. Neural networks, also called associative memories, are modeled on the structure of the brain and have applications in pattern recognition, image processing, natural language understanding, and expert systems, according to MICROSYSTEMES and ELECTRONIQUE ACTUALITES (Mar) and SCIENCES & AVENIR (Jan).

Neural networks represent a novel type of massively parallel computer which, using semiconductor or optical technology, rapidly retrieves and processes data correctly despite incomplete or incorrect input data. They are based on an associative or content addressable memory (CAM), where the computer determines a relationship between two pieces of data by comparing bit patterns stored in discrete electronic or optical components, called neurons. The comparison is achieved by a system which forces the input bit pattern to evolve dynamically until it conforms to one of the many patterns which the system has previously "memorized." The memorization is embodied in precisely adjusted thresholds (electrical or optical connections between neurons) which determine the change of the state of each neuron according to the value of a weighted sum of the states of the other neurons. Items of information are not stored locally but globally as thresholds and interconnect weights of the entire neural network. The states of all neurons evolve simultaneously, thus achieving massively parallel processing.

These systems are capable of comparing and correctly classifying incomplete or somewhat erroneous data. Take for example data "y" which might consist of 10 bits of binary code. The machine compares an input "y" with stored data "y" bit by bit, recognizing the bit pattern most similar to the input. Even if one or more (up to a certain number) of the bits of input "y" are missing or incorrect, the machine recognizes "y" by matching the remaining correct bits.

Exploiting the CAM concept, French scientists at the National Advanced School for Telecommunications (ENST) and the Paris Advanced School for Physics and Industrial Chemistry (ESPCI), have developed a new algorithm for altering the state of the network:

$$\sum_{j=1}^n C_{ij} \sigma_j(t) \begin{cases} > \theta_i \Rightarrow \sigma_i(t+1) = +1 \\ < \theta_i \Rightarrow \sigma_i(t+1) = -1 \\ = \theta_i \Rightarrow \sigma_i(t+1) = \sigma_i(t) \end{cases}$$

The "state" of the network is given by the value $\delta_j^{(t)}$ of each neuron $j=1, \dots, n$ of the network at time t . The state of the i 'th neuron at time $t+1$, $\delta_i^{(t+1)}$, is changed to $+1$, -1 , or remains unaltered as the value of the sum is less than, greater than, or equal to a threshold value θ_i . The values of all other neurons at time t , $\delta_j^{(t)}$, weighted with coefficients C_{ij} , determine the value of the sum. The $(n \times n)$ coefficients C_{ij} , and the n thresholds θ_i determine the evolution of the system.

By way of illustration, the French scientists built a network consisting of a rectangular matrix of 600 (30 by 20) neurons to store input information (in this case, handwritten numerals). Each neuron is a picture element (pixel) black or white (encoded as binary values $+1$ or -1). The matrix of these neurons stores the configuration of a handwritten numeral. The last 10 pixels code the 10 numerals of the decimal system, which are the classifiers desired. The network "learns" by using the new algorithm to

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successively adjust neuron values as each prototype handwritten numeral is presented to the network, forcing the network to evolve to the proper numeral. The 600-pixel network is large enough to allow the machine to learn several prototypes of each numeral. The final set of coefficients and thresholds characterizes a network which has been "taught" to recognize the prototype numerals.

The new algorithm is also used to evaluate input data. After the machine learned the prototype numerals shown in the diagram, it was 80 percent correct in identifying 200 varying handwritten numerals from zip codes selected at random from the ESPCI's mail. Even though the input numerals did not exactly match the prototypes, the machine used the algorithm to decide which stored data was most similar to the input.

PROTOTYPES:

1 1 1 2 2 2 2 3 3 3 3
 4 4 4 4 5 5 5 5 5 6 6
 6 6 7 7 7 7 7 8 8 8 8
 8 8 9 9 9 9 0 0 0 0 0

Results:

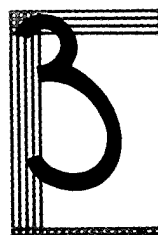
1 1 1 1 1
 4 4 4 4 4 4 4
 5 5 5 5 5 5 5
 6 6 6 6 6 6 6
 8 8 8 8 8 8 8 8 8

Recognized:
80%

5 5 5 5 5 5 5
 6 0 6 6 6 6 6 6

Not recognized:
10%

Classified
Incorrectly: 10%

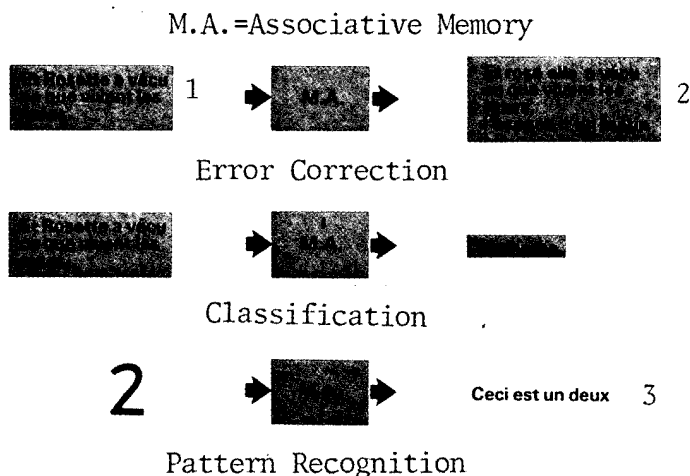


Bit of code

$$\underline{\sigma} = \left[\begin{array}{c} \sigma_1 \\ \vdots \\ \sigma_{590} \\ -1 \\ -1 \\ +1 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1 \end{array} \right] \left. \begin{array}{l} \text{Character} \\ \text{Field of code} \end{array} \right\}$$

Results of ESPCI Pattern Recognition System Using New Algorithm

An experiment conducted at the ESPCI further demonstrates the ability of neural networks to handle nonuniform, even incorrect, input data and determine relationships between two pieces of information. First, an incorrect phrase was retrieved correctly from memory, demonstrating what is termed auto-associative memory. Next, the author (the French poet Malherbe) of the same incorrect phrase was correctly identified, demonstrating hetero-associative memory, where a relation between two items is stored so that if an input is similar to the first item, the memory outputs the second. Finally, the machine demonstrated its use in pattern recognition by associating a stored phrase with an input form.

FOR OFFICIAL USE ONLY***ESPCI Experiment To Demonstrate Capabilities of Neural Networks***

French scientists at the ENST and the Orsay Optics Institute are also conducting R&D in optical valves, devices which modify light beams emitted from, for example, light emitting diodes. ENST scientists have built a 48- neuron prototype optical network in which a magnetic field acts as an optical valve, modifying the system's transparency (the ability to transmit light of different wavelengths) and allowing a response time of several femtoseconds (10^{-15} seconds). Each neuron in this network comprises a receiving diode, connections to other neurons, a light threshold device, and a light emitting diode. Neurons store binary code for white or transparent (1) light and black or opaque (0) light, and can superimpose values to achieve various levels of gray. The ENST system recognizes up to 256 levels of gray. Although still experimental, French R&D aims to develop neural networks which can be inserted like "bricks" in more complicated systems where their unique ability to handle nonuniform input data can be applied in specific functions, according to Gerard Dreyfus, a key scientist at the ESPCI.

* Key to graphic:

¹ And Rosette lived only as long as roses do

² And as a rose, she lived only as long as roses live, just one morning

³ This is a two.

Eva L. X2519/Michael G. X2701

FOR OFFICIAL USE ONLY**FRG: REPORT ON NEURAL NETWORK SUBSIDIES**

Models for practical applications of neural networks are the goal of a five-year R&D subsidy program to be launched by the BMFT (Federal Ministry for Research and Technology) in January 1988, according to **TECHNOLOGIE NACHRICHTEN—MANAGEMENT INFORMATIONEN** (24 Apr). R&D will focus on four applications: the integration of neural networks into larger systems; image processing and analysis of scenes containing movement; natural language understanding; and movement control and coordination. A second, unspecified project phase will study implementation of the systems developed.

Because the BMFT considers the development and testing of algorithms for data processing and storage as critical to final applications, R&D will focus on algorithms for data representation and system organization. Emphasis will be placed on methods of expressing external sensory and motor situations and of perceiving, evaluating, and generalizing knowledge in a neural network. All R&D is targeted to the development of flexible systems able to function in a variety of changing and unpredictable conditions. A group of scientists at the Johannes Gutenberg University in Mainz is coordinating project proposals submitted by FRG industry and research institutes. The BMFT will gather funds from existing projects to subsidize up to 50 percent of approved neural network R&D proposals.

Milan Unit/Eva L. X2519

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FOR OFFICIAL USE ONLY**INTERNATIONAL: NEURAL NETWORK RESEARCH (DATA BASE SURVEY)**

The information below is derived from a search of the INSPEC commercial data base for citations summarizing 1986 journal articles on neural network and associative memory research. INSPEC, based in the UK, cites worldwide scientific literature in physics, electronics, and computers. Additional searches and full-text translations of the records cited below can be provided on request.

COUNTRY AND INSTITUTION	DESCRIPTIVE
FRG Technical University of Munich	Computer simulations of neural network dynamics demonstrate that synaptic strengths and local cell potential result in an ability to associate missing details and correct wrong details in a pattern.
Kaiserslautern University	Animal experiments led to the conclusion that a central pattern generator is a neural network which provides timing cues for the motor output pattern of the central nervous system. Implications for the neural basis of movement are detailed.
NETHERLANDS Philips Research Labs	This research investigates the theory of neural network models, stressing the Boltzmann machine model and two priority applications: pattern recognition and learning.
FRANCE Grenoble Nuclear Studies Center	R&D in long-term memory capacity in complex neural networks reveals that the number of stored bits is proportional to the number of synapses. It was demonstrated that memory capacity can be optimized by dividing the network into neuron clusters the size of cortical microcolumns.
Ecole Normale Superieure, Paris	Two learning schemes which prevent memory overloading and deterioration are examined.
ITALY University of Rome	Results of a study indicate that asymmetry in the synaptic strengths of a neural network is crucial to the learning process.
University of Rome	A way of setting a maximum value for synaptic strength in an associative memory allows only the most recently learned patterns to be recalled, while old patterns are forgotten.

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COUNTRY AND INSTITUTION	DESCRIPTIVE
CANADA Alberta University	The problem of reconstructing external input signals in a neural network is highlighted. Solutions to coding problems for specific network equations are outlined.
Alberta University	The relationship between signal response selectivity and the functional structure in a hypothetical 45-neuron retina is described.
ISRAEL Racah Institute of Physics	The relationship between the number of Hebrew University, Jerusalem memorized patterns and the number of neurons in a Hopfield model is investigated.
JAPAN Ehime University, Matsuyama-shi	Results of differential equations used to describe the dynamics of a neural network and simulations of spatially localized oscillations are reviewed.
Antwerp Unit/Eva L. X2519	

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PREVIEWS

PREVIEWS is an annotated list of selected science and technology items being published by FBIS. The list may also contain previously published items of wide consumer interest.

SCIENCE AND TECHNOLOGY/EUROPE & LATIN AMERICA (formerly EUROPE/LATIN AMERICA REPORT: SCIENCE AND TECHNOLOGY)

ESTABLISHMENT OF MAJOR SEMICONDUCTOR FIRM

Europe's second largest semiconductor firm (as yet undesignated) has been created through a 50-50 merger of SGS (General Semiconductor Company) and Thomson electronic components operations. Thomson's CEO Alain Gomez is interviewed on company strategy to achieve a higher market share and to develop military and civil electronics products. (Paris LE MONDE 30 Apr 87)

FINNAIR CHOOSES MD11 OVER A-340

Article examines reasons that led Finnair to purchase two McDonnell-Douglas MD11 aircraft, with an option for two more. Finnair's first MD11 will be in operation in October 1990. (Helsinki HELSINGIN SANOMAT 2 Apr 87)

FINNISH 3D MEASURING SYSTEM

Article discusses Finnish development of a three-dimensional measuring system that can be used in quality control of factory automation in quick digital measuring of hot processing items and for possible use by underwater robots in repair operations. (Helsinki HELSINGIN SANOMAT 12 Mar 87)

FINNISH-ESTONIAN UNIVERSITY TECHNICAL EXCHANGE

Article discusses agreement between Finland's Turku University and Estonia's Tartu University that provides for the exchange of technical literature and staff rotations. (Helsinki KANSAN UUTiset 17 Apr 87)

TELECOMMUNICATIONS (formerly WORLDWIDE REPORT: TELECOMMUNICATIONS POLICY, RESEARCH, AND DEVELOPMENT)

PLANS, DESIGN, EQUIPMENT FOR FRENCH ISDN NETWORK THROUGH 1988

The status of France's four-phase plan to implement nationwide ISDN is examined. The structure of the currently operating Transcom ISDN is diagrammed and the RENAN project to test new ISDN equipment is detailed. (Paris FRANCE TELECOM Feb 87)

